Final comments to the authors of:

hess-2017-136 - A conceptual prediction model of seasonal drought processes using atmospheric and oceanic Standardized Anomalies: application in four recent severe drought events in China, by Zhenchen Liu, Guihua Lu, Hai He, Zhiyong Wu, and Jian He

Dear authors,

I appreciated the revised version and modifications, which greatly improved the manuscript. There were some significant changes, which clarified the study methodology and results, but I think some minor technical/language revision of the paper can still be done to prepare the final version of the manuscript before its publication, which I recommend (without further revision by reviewers or the Editor).

My suggestions are listed below:

- I think the title is too long, with too many adjectives. I suggest to slightly shorten it to: "A conceptual prediction model for seasonal drought processes using atmospheric and oceanic standardized anomalies: application to regional drought events in China"
- Abstract:
    - line 10: change to "we developed"
    - line 10: "based on atmospheric and oceanic…"
    - lines 11-12: "at 200 hPa and 500 hPa…"
    - line 16: change "It can make seamless drought prediction…" to "The model can make seamless drought predictions…"
    - line 17: too many adjectives (recent severe regional drought) for the world "event". Please rephrase it by checking the use of the English language.
    - lines 18-19: the last sentence ("Therefore,…") is not fully comprehensive, especially given the limitations written just before it. I suggest changing to the following: "Overall, the model can be a worthy reference for seasonal water resources management in China."
- Line 36: what do you mean by "short-range"? One day ahead? A week ahead? One month ahead? Please, specify.
- Line 39: consider changing to "…physical, complex processes…"
- Line 41: consider changing to "…input variables, a methodology and prediction…"
- Lines 44-45: it seems to me that here you are talking about hydrological drought (ESP method) instead of meteorological drought as stated earlier in lines 30/31. Could you clarify it please?
- Lines 53-54: consider changing to "Climate indices, such as… are simple, explicit and widely used. Therefore, they are…"
- Lines 65-66: consider changing to "…all these predictors, influencing different drought processes, and the 3-month SPI updated daily (hereafter, SPI3) were used to calibrate a synchronous …"
- Overall, please check when using "process" and "events". Sometimes it seems to me that you mean "drought events" and not "drought process", as, for instance, in lines 73, 77, 78, 79, 131, Fig. 4 caption, etc. If you really mean "process", please add a sentence clarifying the way you define these two different things (process and event) in the study.

- Line 76: correct to singular verb in "…a brief but general introduction with… is presented (Fig. 1), …"
- Line 79: consider changing to "Therefore, event-split rules, according to dry/wet spells, are designed to assign drought event segments to different dry/wet spells in Sec. 4"
- Line 80: consider deleting "Meanwhile,"
- Line 82: consider changing to "…are important inputs to the construction of the predictors."
- Line 86: consider changing to "…and the NCEP… operational forecast datasets are used to… relationship." Consider also deleting "respectively."
- Fig 1 caption: consider changing to "…sequential procedures described in the sections of this study for drought…"
- Line 93: consider changing to "…events in North China are used to…"
- Line 94: consider splitting into two sentences and changing to "…and calibration in Sec. 3-6. Similar procedures were applied in East and Southwest Chine but, for the sake of conciseness, are not shown in this study."
- Line 102: please, check if the right use of English is "over North China" instead of "in North China)
- Lines 102-103: could you indicate the area, in km^2, of these three regions?
- Line 104: consider changing to "the NCEP…dataset, which has…"
- Line 105 and 107: the use of "to the present" does not clarify the reader on what data period was actually used. Please, consider specifying the period of data used in the study.
- Lines 104-105: consider changing to "…and extending from…, was used for SST anomaly analysis.
- Line 108: consider changing to "…was used to verify the operational performance…"
- About CFSv2: I am missing a description in more details of the data used: forecasts issued when? Daily? At each month? For which maximum lead time? What did you use in the study: anomalies with respect to model climatology or precipitation forecasts? If anomalies, what was the climatology? Did you use an ensemble? If yes, how many ensemble members were used?
- Line 110: I suggest using "forecast" instead of "forecasted". Although both are correct, "forecast" is more common (even referring to the past).
- Line 111 (page 5): consider changing to "… forecast datasets were transformed into daily forecasts with a simple time-weighted mean". Also, what do you mean by "time weighted mean"? Wasn't it enough to add four blocks of 6-hour precipitation to have the 24-hour precipitation? What is "averaged" here?
- Fig. 2: consider indicating the North in the map and the relative position of the area in the world map. Consider deleting the word "study" when referring to the nine drought regions, as, for the reader, study regions are only the three regions of the study. Also, the light grey curves are not visible; consider not presenting them if they are not important for the comprehension of the study.
- Lines 118-125: this paragraph is very confusing to me. I suggest some re-writing as follows:
    - First, line 118: consider splitting the sentence into two: "in this study. The calculation period is…"
    - Line 119: then, consider adding here the last sentence. "… period is 1979-2014. The daily area-averaged precipitation datasets were first computed over the three study regions."

    - Then add the way you computed the SPI3 from these daily values: “Usually, SPI3 values vary in a monthly time scale, i.e., each month a new value is determined from the precipitation totals of the previous three months …”
    - Then, lines 120 onwards, I suggest changing to the following: “In this study, we chose to update the SPI3 daily, which was also recommended by…, i.e., every day a new value is determined from the precipitation totals of the previous three months. Specific illustration and details for …. are shown in Fig. 3.” I suggest to end the paragraph here.
- Line 135: consider deleting the part “(e.g., severely dry)” as this is not needed for comprehension.
- Line 136: consider changing to “…to the slightly dry grade…”
- Line 144: why only North China? What about the other studied regions? Could you add the events for the other regions in Table 2? Or at least mention in the text the number of events identified to each grade?
- Line 152: consider changing to “…spells in order to further…
- Line 153-154: I do not fully understand this sentence. Are you referring tie the case in Fig. 4? Or is it valid for all cases due to the methodology adopted? Please, clarify. Also what do you mean by “special”?
- Line 177: isn’t this a repetition of what is already said in line 156? Please, check if it is necessary or if you can shorten the text here.
- Line 191: consider changing to “…variables, which, on this study, are…”
- Line 196: consider changing to “…at each grid point”.
- Line 198: consider changing to “…to decompose spatial-temporal datasets of…”
- Line 200: consider changing to “Considering that …, we focus on them in this study.”
- Line 201: consider changing to “In addition, in order to…”
- Line 206: do you mean “Relevant results are shown in Fig. 7,…”? Considering changing “found” to “shown” if this is the case.
- Line 218: consider deleting the repetition of the word “area” and changing to “… positive pattern (Region B)…”
- Line 226: I do not understand what you mean by “ignored”. Do you mean ignored in the analysis (i.e., not considered) or do you mean ignored in the illustrations (i.e., not shown here, but considered in the analysis). Consider changing to “…, the specified illustrations are not shown here” or “….were ignored in the analysis”, according to the meaning you want to give here.
- Line 229: consider changing to “…used for the construction of the predictors”.
- Line 240: consider changing to “In this study, it is used to build the synchronous…”
- Line 241: consider changing to “…and the prediction target SPI3.”
- Line 245: I do not fully understand the first sentence. Do you mean the model is calibrated for every year, i.e., every year has a set of parameters? Please, clarify and check the use of the English language. The explanation in line 251 seems clearer.
- Line 247: correct to “Table 6” (not Table S1)
- Line 251: not fully clear to me. Consider changing to “…therefore, the number of samples used for calibration also increases year by year.” Is that what you mean?
- Line 255: what do you mean by “key turning points and trends”? Consider either deleting this part or explaining it.

- Line 264, 270: consider changing to “forecast” instead of “forecasted”, since it is more commonly used. Check for other uses in the text too.
- Lines 265-266: since the references for the datasets were already specified before, I think you do not need to add then here. They can be deleted.
- Line 266: this part can also be deleted: “… which is a type of climate forecast model”, since you have already introduced the dataset in Sec. 2.
- Line 325: why do you use the word “eventually”? I would suggest deleting it.
- Line 438-439: consider changing to “…helped improve the clarity of the manuscript and made us think about …”.
- Overall suggestion for Section Discussions or Conclusions: since the paper will be published on a special issue on seasonal hydrological forecasting, could you add a sentence on how the work presented on meteorological drought could be used for hydrological seasonal forecasting/outlook? Thanks!

Thank you for your manuscript!

Best regards,

Maria-Helena Ramos

Guest Editor for the Special Issue: Sub-seasonal to seasonal hydrological forecasting